

ATOMIC ENERGY

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Dear Sir:

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A budget of \$1,189,960,700 for the U. S. Atomic Energy Commission, for fiscal year 1955, has now been approved by the appropriations committee of the House of Representatives. The original USAEC request had been for \$1,342,000,000. Reductions which were made included the cancellation of \$12 million requested by the Commission for the construction of a number of processing plants; the committee contended that private industry should build such plants out of private funds. Another large reduction was the scaling down of contingency funds on construction, amounting to \$122 million. Here, the committee complained that the USAEC in recent years had consistently overestimated construction costs on its major projects. Specifically, it declared that the cost of the K-29 and K-31 gaseous diffusion plants at Oak Ridge had run 40% below the original estimates. Included in this new budget, and approved by the committee, was \$320,926,000 for weapons production in the 1955 fiscal year. There was also an increase in funds for fissionable materials, from \$281,093,542 in 1953, to \$448,661,000 as estimated for the current (1954) fiscal year, and now to \$740,042,000 for the 1955 fiscal year.

The current series of tests of fusion weapons ("hydrogen" bombs) in the Pacific Proving Ground saw another fusion-type device detonated last fortnight (Mar. 26). In an attempt to forestall the consequences of the March 1st fusion detonation (when individuals were injured by the fall-out) Naval and Air Force units attached to the task force made a careful search of the danger area. This area had also been considerably enlarged, since the first detonation March 1st had shown that it did not provide an adequate margin of safety. Meanwhile, President Eisenhower in Washington confirmed that this first detonation "surpassed the expectations" of the scientists working on the project. (This LETTER, 3/23/54, noted that the explosion was greater than had been estimated.)

Transfer of the feed materials production responsibilities of the USAEC's New York office to the Oak Ridge Operations office is to take place this July 1st, according to K. D. Nichols, the USAEC's general manager. However, the USAEC will continue to maintain a New York office to supervise its Health and Safety Laboratory there; the 275 research and development contracts which are chiefly at universities and laboratories; and Brookhaven National Laboratory, L. I.

A description of the types of fission (atomic) bombs that might be smuggled into the United States in an attempt at sabotage has now been sent to police agencies by the Federal Bureau of Investigation. The description pointed out that fifty pounds of uranium or plutonium would be no bigger than a softball, and explains that this sphere could be surrounded by charges of conventional high explosives to create an implosion, or a bursting inward, to compress and thus set off the fissionable material. Another device described was of the gun barrel type. Here, a projectile of fissionable material would be fired down a gun barrel into another plug of fissionable material in the muzzle of the gun barrel.

BUSINESS NEWS...in the nuclear energy field...

INVESTMENT COMPANY IN ATOMIC FIELD CONTINUES GAINS: Additions to the common stock holdings of Atomic Development Mutual Fund, Inc., Washington, D. C., show increasing diversification of portfolio holdings. The Fund, an open-end, management investment company, specializes in securities of companies participating in activities resulting from nuclear work. Investments are made by the Fund in companies with gross revenues principally from nuclear work, and in established firms deriving only part of their revenues from nuclear work. The Fund limits its stock acquisition in the former to 60%, and in the latter to 40%.

Stock of United States' firms, in the raw materials field, held by the Fund, includes Blockson Chemical Co., International Minerals & Chemicals Co., Kerr-McGee Oil Industries, Inc., Homestake Mining Co., Lindsay Chemical Co., Vanadium Corp. of America, and Foote Mineral Co. Fund holdings in Canadian raw materials companies include Centre Lake Uranium Mines, Ltd., Gunnar Gold Mines, Ltd., Pronto Uranium Mines, Ltd., and Rix Athabasca Uranium Mines, Ltd.

In the nuclear instrument and allied product field, holdings of the Fund include Abbott Laboratories, Atomic Instrument Co., Beckman Instruments, Inc., Consolidated Engineering Corp., Metal Hydrides, Inc., Nuclear Instrument & Chemical Corp., Tracerlab, Inc., Victoreen Instrument Co., and Vitro Corp. of America.

Among contractors to the USAEC, Fund holdings include Allis Chalmers Mfg. Co., Babcock & Wilcox Co., Dow Chemical Co., du Pont, General Electric Co., Goodyear Tire & Rubber Co., Grinnell Corp., General Dynamics Corp., Harshaw Chemical Co., National Lead Co., Phillips Petroleum Co., Union Carbide & Carbon Corp., United Aircraft Corp., and Westinghouse Electric Corp.

President of the Fund is Newton I. Steers, Jr. Mr. Steers was assistant to the assistant general manager of the USAEC (1951-July, 1953). Chairman of the board and vice-president is Merle Thorpe, Jr., associate, Hogan & Hartson, attorneys, Washington, D.C. Technical adviser to the Fund is Nuclear Development Associates, Inc., White Plains, N.Y. and investment adviser is Auchincloss, Parker & Redpath, Washington, D.C.

NEW CENTER TO BE BUILT AT OAK RIDGE: A modern commercial center is now to be built at Oak Ridge, Tenn., by a private concern. At present, Oak Ridge's two small commercial centers, and eight neighborhood shopping areas, are all Government owned; this has been a policy since the town was established to provide housing for those connected with the Oak Ridge gaseous diffusion plants, laboratories, etc. The town is to have a 117 acre center, according to plans of Oak Ridge Properties, Inc., the firm which will operate the area. A fifty year lease has been signed by this firm, with Management Services, Inc., the business agent of the USAEC at Oak Ridge.

BIDS ASKED FOR CONSTRUCTION OF MOAB, UTAH, PLANT: Bids have now been asked for construction of a crushing and sampling plant to be built at Moab, Utah, under a USAEC contract; plans, specifications, and bid forms are available at the USAEC's headquarters, South Redland, Grand Junction, Colo. Bid closing date: April 16, 1954. This new buying station at Moab will provide a convenient market for acceptable uranium ores being produced in the Moab area which are not amenable to the plant process now being used at the Monticello station. The plant, which will be one of the largest uranium ore receiving stations in the Colorado Plateau, will incorporate mechanical sampling equipment and procedures to obtain accurate ore samples. Operation of the facility will be by American Smelting and Refining Co., as ore buying agent for the USAEC.

PREDICTION MADE OF ATOMIC POWER COSTS: Sir John Cockcroft, director, Atomic Energy Research Establishment, Harwell (England), recently told a Parliamentary and Scientific Committee of the House of Commons in London that at least eight years of operating experience would be a necessary development period before England's first atomic power station would become practical. He explained that the efficiency of conversion of heat into electricity would be limited by present inexperience in operating uranium fuels and their containing sheaths at high temperature. He observed that if the temperature could be increased by 100 deg. C., by using an improved metal sheath, that a substantial reduction in capital cost per unit of power generated should be achieved.

PRODUCTS & PROCESSES...in the nuclear field...

FROM THE MANUFACTURERS: Scintillation spectrometer, Model 2300; said to be the first completely automatic scintillation spectrometer. The Model 2300 series equipment consists of this manufacturer's: Model 118, electronic sweep and count rate computer; Model 115, pulse height analyzer; Model 80 precision high voltage supply; Model 43 scintillation counter; and a Brown Electronik recorder. Manufacturer states that channel level and counting rate may be read instantly on the meters located on the electronic sweep and count rate computer. --Radiation Instrument Development Laboratory, Chicago 36, Ill.

LABORATORY DEVELOPMENTS: A new thermocouple, which makes possible temperature measurements inside the fuel elements of operating nuclear reactors, has been developed by Dr. W. Gerard Rauch, of Argonne National Laboratory's Metallurgy Division. This new thermocouple is only slightly thicker than a standard hypodermic needle. Because of its thinness, flexibility, and ruggedness, it can be threaded through small and winding passageways into places which cannot be reached by conventional thermocouples. Construction of the thermocouple consists mainly of inserting a thin insulated constantan (copper-nickel-manganese alloy) wire into a small diameter inconel tube of the hypodermic needle type, and drawing the tube through a die on a draw-bench, thereby tightly gripping and sealing the wire within the tube. The couple elements then are the inconel tube, and the constantan wire; fabrication of the thermocouple is completed by fusing the wire and tubing at one end. Such thermocouples, which are 0.040-inches in diameter, and twenty feet in length, have been constructed by Argonne scientists to detect and record temperatures up to 1,250 deg. F.

NOTES: Production of isotopes by Britain's Atomic Energy Research Establishment, Harwell, totaled some 12,159 shipments during the past year, figures recently released now show. Shipments were made within Britain, and abroad. Translated into dollar values, this sales level is the equivalent of some \$700,000.

A five year research program on the ability of ionizing radiation to preserve foodstuffs will be transferred to the Quartermaster Corps, U. S. Army, this June 30th, Dr. J. S. Butts, of the USAEC, told a Congressional committee in Washington last week. Dr. Butts said the program involves \$6 million in contracts with 15 colleges and universities. He said the main objective is to enable such preservation without refrigeration. Dr. W. Ralph Singleton, senior geneticist, Brookhaven National Laboratory (L. I.), told the committee that radiation genetics was a most important agricultural development. At Brookhaven, where experiments have been conducted for some years along these lines, there has already been produced a disease-free variety of oats, and the yield of a strain of peanuts has been increased 30%, he stated. Now, he noted, Brookhaven scientists are attempting to develop a blight-free corn on shorter stalks, but with greater yields. He asserted that this research promises as much as the development of hybrid corn several years ago.

NEW BOOKS & OTHER PUBLICATIONS...in the nuclear field...

Nuclear Data Cards. These cards, which are designed to make it possible to collect quickly and conveniently information either on particular nuclei, or on particular properties of nuclei, are now being continuously printed by the nuclear data group of the National Research Council. The work is supported by the USAEC and the National Bureau of Standards. They are being made available to subscribers in sets of about 100 monthly. Annual cost is estimated at \$20 per year. Inquiries should be directed to--National Research Council, Washington 25, D. C.

Utilization of Radiation from Fission Products: A Symposium. This is an edited report on this symposium, which was held last year at Harwell, England, under the auspices of the Atomic Energy Research Establishment. 154 pages. --British Information Services, New York 20, N. Y. (\$4.50)

High Resolution High Intensity Scintillation Detector, by W.C. Hall, et al, U. S. Naval Research Laboratory. Work done at the Laboratory on such a device the early part of 1952. 8-pages.--Office of Technical Services, Washington 25, D.C. (50¢)

Business Opportunities in Atomic Energy. Proceedings of conference recently held in New York on that subject. --Atomic Industrial Forum, Inc., New York 16 (\$6.00)

Atomic Experiments for Boys, by R.F. Yates. A treatment of the subject at the "amateur" level. 132 pages.--Harper & Bros., New York 17. (\$2.50)

AEC'S NUCLEAR POWER DEVELOPMENT PLANS. Condensation of a talk by that title delivered by Eugene M. Zuckert, Member, USAEC., at meeting of National Industrial Conference Board, Los Angeles, Calif., Mar. 25, 1954.

Let me give you some of my impressions of how the Commission intends to proceed in the development of atomic energy for peaceful uses, with primary emphasis on atomic energy for power. At the moment it seems that atomic energy for power offers the greatest promise, without disparagement to the growing applications in industry, medicine, and agriculture. We will push ahead in these fields. We will also explore the possibilities of atomic energy for propulsion. We are on the threshold of an atomic submarine as a reality; we are making significant progress in the application of atomic energy to an airplane; and we have a study agreement with Newport News Shipbuilding looking into the possibilities of atomic energy for ship propulsion.

But today I want to talk to you about atomic energy for power.

This will be a progress report and an attempt to look ahead.

We have submitted to the Joint Congressional Committee on Atomic Energy a five year reactor program in response to their request for a report on our plans to surmount the technical hurdles. (The five year program: this LETTER, 3/23/54.) We are going to explore at once in this program five different technologies, each of which holds promise.

One of these approaches involves the sodium-graphite technology that North American Aviation has been studying for some time. It would use sodium as a coolant and graphite as a moderator, giving the advantages of high temperature without high pressure. We have decided to go ahead with a reactor designed to produce about 20,000 kilowatts of heat but without any equipment attached to convert the heat to electricity.

North American and the USAEC have recently reached an agreement to share the responsibility of this experiment. The entire project is expected to cost about \$10 million, including the cost of a site, research and development, construction, and an operation test program of two years. North American will assume \$2.5 million of the cost of the program, including the site, housing, and utilities necessary for the reactor experiment. The project will be completed in 1958.

Another approach is the pressurized water reactor project; it is the one in which we invited private industry to share some of the responsibility. As you know, the proposal made to the USAEC by the Duquesne Light Co., Pittsburgh, Pa., proved to be most advantageous to the Government. Here is how the U.S.'s first full-scale central station nuclear power plant will be built: At no cost to the Government, Duquesne furnishes the site for the entire project, builds and operates a new electric generating plant, furnishes the labor to operate the reactor portion of the plant, and assumes \$5 million of the cost of research, development, and construction of that portion. The company agrees to pay for the steam at the rate of 8 mills per kilowatt-hour of net output of the generator. It also waives any reimbursement by the Government of costs incident to termination of the contract.

In the exploring of the three other technologies, we are proposing four more reactor projects. We have already done much research and development work on each of these approaches. One project--a breeder reactor of intermediate size--will be a scale-up from 170 to 15,000 kilowatts of electric power. Another project will be an experimental boiling water reactor with an output of 5,000 kilowatts of electricity. And in the last approach--the homogeneous reactor--we are planning two projects. One would be a slight scale up of the small homogeneous experiment at Oak Ridge. The other would be a larger homogeneous reactor that would produce 65,000 kilowatts of heat and breed uranium-233 in a blanket of thorium surrounding the core.

Leaving the reactor program, and going into the general research program, we hope to build an experimental full fabrication facility at Argonne National Laboratory to explore the problem of recycling fissionable material. If such recycling is achieved without inordinate costs, it could mean nuclear fuel at costs in the order of one mill per kilowatt-hour of electricity even in those reactor designs which require somewhat enriched (and hence more expensive) fuel.

RAW MATERIALS...radioactive mineral & ore development...

UNITED STATES: Additional minerals have now been classified as strategic by the Secretary of the Interior. This has resulted in making the exploration of some thirteen additional metals eligible for Government funds to the extent of 75% of such exploration costs. Included in this list were such minerals and/or metals valuable to the atomic energy program as monazite, thorium, and the rare earths. Already on this list were uranium and beryl...The results of an airborne radioactivity survey of 5,600 traverse miles in ten areas in Florida that were thought to be geologically favorable for the occurrence of uraniferous deposits have now been released by the Geological Survey, which made the survey for the USAEC. The report is accompanied by maps which show the location of areas of abnormal radioactivity; it is available for examination at GS and USAEC offices.

Anaconda Copper, which had previously acquired uranium prospects in the Marysvale, Utah, and other areas, has now taken under lease some 20 claims in the Temple Mountain area, in Utah. Development is said to be planned at once, with a program of undercoring to evaluate the ore body....A report of uranium ore deposits some nine miles north of Canon City, Colo., has now been made by the Colorado Exploration Co. The claims are located in the Garden Park area north of Canon City, in Fremont County, in an isolated public domain area....Thirty-nine uranium claims on San Rafael Swell, Utah, north of Temple Mountain mining district, have now been acquired by Union Uranium Co., Denver, that firm reports. The claims are now shipping over 200-tons of uranium ore per day.

CANADA:- New financing has now been obtained by Pronto Uranium Mines through sale by the company of some 500,000 shares, netting the firm \$1.5 million. Purchasers of the shares included some mining companies. Officials state that this will be adequate to carry out the underground development necessary to equip the property for production on the basis of 1,000-2,000 tons daily. Pronto intends to have this mine development program undertaken as a single large contract....Tungsten Corp. of Canada acquired additional uranium properties during the past year, states W. A. Smith, president, in the annual report. Its holdings include 506,890 shares in Centre Lake Uranium Mines, Ltd. (control of which is now held by Consolidated Ranvaick Uranium Mines, Ltd.). Its new acquisitions include a uranium prospect adjoining east of both Centre Lake and Croft Uranium holdings on the Bancroft area, Eastern Ontario. The firm has also continued prospecting its tungsten prospects, Mr. Smith states.

TECHNICAL MEETINGS & INSTRUCTION COURSES...in the nuclear field...

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS: The economic prospects for a nuclear power station in New England are to be considered at the Spring symposium of the Boston section of the A.I.Ch.E., to be held April 14 in Boston. Three papers will be presented dealing with the engineering phases, as well as the economics, of nuclear power systems. A paper on the Engineering Of Nuclear Power Systems will be given by Kenneth Davis, deputy director, reactor research, USAEC. Another paper will be on Nuclear Power Economics, by Frederick Argue, Stone & Webster Engineering Corp. Future Power Requirements in New England will be discussed by Clarence W. Mayott, consultant to the Hartford Electric Light Co.

OAK RIDGE INSTITUTE OF NUCLEAR STUDIES OFFERS COURSES: A two week course on radioactivity will be offered by the Institute's Special Training Division this Summer. Designed for teachers in secondary schools and teacher's colleges, the course will begin this June 7th. It will consist of background lectures in physics and radioactivity, together with a demonstration of all experiments outlined in the recent USAEC publication: "Laboratory Experiments with Radioisotopes". Emphasis throughout the course will be on the technique of using radioisotopes in classroom demonstrations, and in laboratory work....An advanced course in radioisotope applications in biochemistry will be held from September 6-17 by the Division. This is the second such course given by the Division.

Sincerely,

The Staff,
ATOMIC ENERGY NEWSLETTER

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